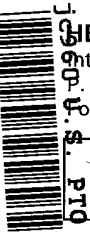


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HEWLETT-PACKARD COMPANY
Intellectual Property Administration
P. O. Box 272400
Fort Collins, Colorado 80527-2400

PATENT APPLICATION

ATTORNEY DOCKET NO. 10001609-1

IN THE U.S. PATENT AND TRADEMARK OFFICE
Patent Application Transmittal Letter

COMMISSIONER FOR PATENTS
Washington, D.C. 20231

Sir:

Transmitted herewith for filing under 37 CFR 1.53(b) is a(n): ☒ Utility () Design
(X) original patent application,
() continuation-in-part application

11/07/00
09/708770
Jc825 U.S. PTO

INVENTOR(S): James E. Obert et al

TITLE: Systems And Method For Remote Management Of Printing Devices

Enclosed are:

- (X) The Declaration and Power of Attorney. (X) signed () unsigned or partially signed
(X) 4 sheets of drawings (one set) () Associate Power of Attorney
() Form PTO-1449 () Information Disclosure Statement and Form PTO-1449
() Priority document(s) () (Other) (fee \$)

CLAIMS AS FILED BY OTHER THAN A SMALL ENTITY				
(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) TOTALS
TOTAL CLAIMS	20 — 20	0	X \$18	\$ 0
INDEPENDENT CLAIMS	3 — 3	0	X \$80	\$ 0
ANY MULTIPLE DEPENDENT CLAIMS	0		\$270	\$ 0
BASIC FEE: Design (\$320.00); Utility (\$710.00)				\$ 710
TOTAL FILING FEE				\$ 710
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By Dianna Baker
Typed Name: Dianna Baker

Respectfully submitted,

James E. Obert et al

By Steven R. Ormiston

Attorney/Agent for Applicant(s)

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PATENT APPLICATION
DOCKET NO. 10001609-1

**SYSTEMS AND METHOD FOR REMOTE MANAGEMENT
OF PRINTING DEVICES**

INVENTOR(S):

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Letty B. Nutt
William A. Cox

002070 110700

SYSTEMS AND METHOD FOR REMOTE MANAGEMENT OF PRINTING DEVICES

TECHNICAL FIELD

5 The systems and methods for remote management of printing devices described herein relates to accessing and controlling network printing devices from a remote location. More specifically, the described implementations relate to third party access and control of workstation printing devices that are connected to the workstation by a network interface or by a direct connection such as USB or a
10 parallel port.

BACKGROUND

 Distributed networks that include several printing devices pose a logistical problem for managing and maintaining the printing devices so that down time is
15 minimized. Problems in discovering faults that occur in printing devices and communicating information about these faults to maintenance technicians increase in proportion to the number of printing devices on the network or workstation and the physical distance between printing devices and/or between the printing devices and the maintenance technicians.

20 Printing device management solutions tend to focus primarily on management of network printers that reside on large company enterprises. These tools typically gather status information for the network printing devices on the enterprise-wide network, such as a local area network.

 In addition, such solutions typically require large binary files to be installed
25 on each personal computer or server within the enterprise. This, in itself, causes support issues when upgrades to management software are released.

A significant problem with current printing device management solutions is that, while they can gather information from printing devices connected to the network, they cannot access a printing device that is directly connected to a workstation computer through, for example, a Universal Serial Bus (USB) port or a parallel port. Furthermore, local area network solutions do not allow for remote, cross-firewall discovery and connection to network printers by third party service providers. Third party service providers are also unable to view printing device data and use management tools from outside of the enterprise firewall at the same time that another third party user or a user on the local area network accesses the data.

SUMMARY

The systems and methods for remote management of printing devices described herein allow a maintenance organization that is not affiliated with an enterprise or the enterprise equipment to perform remote diagnostics or get diagnostic data from enterprise equipment, including enterprise printing devices. Such access allows a maintenance technician to gain an understanding of the state of the equipment before making a service call. This will help the maintenance technician fix equipment problems more quickly and more accurately.

In one described implementation, printing devices that are directly connected to a workstation computer through, for example, a USB (Universal Serial Bus) port or a parallel port, can be accessed through a customer's local area network or remotely through the Internet. This is in addition to providing access to network printing devices.

One advantage provided by the described implementations is that the software that provides the content that is visible to a third-party service provider is stored outside of the customer's enterprise. Therefore, when this software requires updating, it is not necessary to upgrade software applications on multiple workstation computers; the update is only applied to the software at the service provider's site.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of exemplary methods and arrangements of the present invention may be had by reference to the following detailed description when taken in conjunction with the accompanying drawings wherein:

Fig. 1 is an illustration of a distributed computing environment including a local area network, a wide area network and a remote system.

Fig. 2 is a block diagram of the distributed computing environment illustrated in Fig. 1.

Fig. 3 is a flow diagram depicting a method for managing workstation printing devices from a remote location.

Fig. 4 is an illustration of a display page of a user interface for a printer information management system according to one embodiment of the invention.

DETAILED DESCRIPTION

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The invention is illustrated in the drawings as being implemented in a suitable computing environment. Although not required, the invention will be described in the general context of computer-executable instructions, such as program modules, to be executed by a computing device, such as a personal computer or a hand-held computer or electronic device. Generally, program modules include routines, programs, objects, components, data structures, etc., that perform particular tasks or implement particular abstract data types. Moreover, those skilled in the art will appreciate that the invention may be practiced with other computer system configurations, including multi-processor systems, microprocessor-based or programmable consumer electronics, network PCs, minicomputers, mainframe computers, and the like. The invention may also be practiced in distributed computing environments where tasks are performed by remote processing devices that are linked through a communications network. In a distributed computing environment, program modules may be located in both local and remote memory storage devices.

General reference is made herein to one or more printing devices. As used herein, "printing device" means any electronic device having data communications and data storage capabilities, and functions to render printed characters on a print medium. The term "printing device" includes, but is not limited to, printers, copiers, facsimile machines and plotters. The term "printer" includes, but is not limited to, laser printers, ink jet printers, dot matrix printers, dry medium printers and the like. Although specific examples may refer to one or more of these printing devices, such examples are not meant to limit the scope of the claims or

the description, but are meant to provide a specific understanding of the described implementations.

Fig. 1 depicts a distributed computing environment 100 that includes a local area network 102. The local area network 102 includes a customer workstation cluster 104 and a printer cluster 106. The customer workstation cluster 104 has four workstation computers 108, 110, 112, 114. Although the customer workstation cluster 104 is shown as having four workstation computers 108-114, it is noted that the customer workstation cluster 104 may include from one to any practical number of workstation computers.

The printer cluster 106 includes three printers 116, 118, 120. Although the printer cluster 106 is shown as having three printers 116-120, it is noted that the printer cluster 106 may have from one to any practical number of printing devices. Each printer 116-120 in the printer cluster 106 communicates with one or more of the workstation computers 108-114 through a connection 122 that may be a network connection or a direct connection. As used herein, direct connection means, but is not limited to, a USB connection or a parallel port connection. A printer that is connected to a USB port or a parallel port of a workstation computer is referred to as a "local" printer for the workstation computer. For discussion purposes, printer 116 is connected to a USB port of workstation computer 114, printer 118 is directly connected to the local area network 102, and printer 120 is connected to a parallel port of workstation computer 110.

The distributed computing environment also includes a customer ISP (Internet Service Provider) server 124 that is connected to the Internet 126. The customer ISP server 124 provides Internet service to the local area network 102 through an Internet connection 128. Specifically, one of the workstation

computers 108-114 communicates with the customer ISP server 124 to establish the Internet connection 128. For discussion purposes, assume that workstation computer 108 establishes the Internet connection 128 with the customer ISP server 124. The other workstation computers 110-114 are provided with Internet service via the local area network 102 connection with workstation computer 108.

The distributed computing environment 100 also includes a remote diagnostics center (RDC) server 130 that communicates with the Internet 126. A remote diagnostics center (RDC) computer 132 communicates with the Internet 126 via an Internet connection 134 with the RDC server 130.

Fig. 2 is a block diagram of the distributed computing environment 100 shown in Fig. 1. Workstation computer 108 includes a display 200, a network interface card 202 to provide network connections and memory 204. A printer information management system component 206 is stored in the memory 204.

Workstation computer 110 includes a display 208, a network interface card 210, a parallel port 211, and memory 212 having a printer information management system component 214 stored therein. Workstation computer 112 includes a display 216, a network interface card 218 and memory 220 having a printer information management system component 222 stored therein.

Workstation computer 114 includes a printer information management component 224 stored in memory 226, a display 228 and a network interface card 230. A USB port 232 is also included in workstation computer 114. Printer 116 is connected to the USB port 232 of workstation computer 114. Printer 116 includes memory 234 having a diagnostic module 236 stored therein.

Printer 118 includes memory 238 in which a diagnostics module 240 is stored. Printer 118 is connected to the local area network 102. Printer 120

includes a diagnostics module 242 stored in memory 244. Printer 120 is connected to the local area network 102 via the parallel port 211 of workstation computer 110.

The remote diagnostics center server 130 hosts a remote diagnostics center website 246. A printer information management system 248 is located at the remote diagnostics center website. The remote diagnostics center computer 132 includes a display 250, a network interface card 252 and memory 254. A printer information management system component 256 is stored in the memory 254.

The printer information management system 248 that is located at the remote diagnostics center website 240 and the printer information management system components located in various other system devices will be discussed in greater detail below. It is noted that the printer information management system 248 is the largest portion of the software that implements the present invention. The printer information management system components are much smaller software modules that are used to access local data and provide the local data to the printer information management system 248, where the printing devices are centrally managed.

Fig. 3 is a flow diagram outlining a method for managing workstation printing devices, including printing devices connected to a workstation computer via a parallel port, from a remote location. At step 300, a customer identifies a problem with a printer 116-120 (printer 116 for this example). The diagnostics module 236 that operates within printer 116 initially identifies a problem with the printer 116 and provides an indication of the problem to the customer. This indication may be provided in the form of a printout or may be an error message

displayed by the printer 116. The indication may also be an electronic signal propagated by the printer 116.

The customer then accesses the printer information management system 248 on the remote diagnostic center server 130 using one of the workstation computers 108-114 (step 302). For discussion purposes, workstation computer 108 is used to access the RDC server 130. At step 304, a determination is made as to whether the workstation computer 108 has the printer information management system component 206 stored in the memory 204 of the workstation computer 108. If the printer information management system component 206 is not stored in the memory 204 ("No" branch, step 304), then the printer information management system component 206 is downloaded from the remote diagnostics center website 246 at step 306.

If - as in the present example - the printer information management system component 206 is present in the memory 204 ("Yes" branch, step 304), then step 306 is omitted and processing continues. A user interface is displayed when the printer information management system component 206 begins execution. The remainder of Fig. 3 will be discussed below, after the user interface is described in more detail.

Fig. 4 is an illustration of a display page of a user interface of the printer information management system, showing the location and identification information received by the workstation computer 108 at step 310. Fig. 4 includes a monitor 400 within which a display 402 is situated. The printer information is shown on the display 402 in the form of a location/id table 404. The location/id table 404 includes a host column 406, which indicates the host of each printer. A host can be any workstation computer 108-114 to which a printing device is

connected through a parallel port, or it can be the network 102 if a printing device is connected to the network 102.

The location/id table 404 also includes a printer name column 408. The printer name column lists a network name of a printer, the network name for a printer uniquely identifying the printer within the network. The location/id table 404 further includes a model column 410. The model column 410 includes a manufacturer name for a printer. The name displayed in the model column 410 informs a maintenance technician of the model of the printer, so that the maintenance technician can locate parts and supplies for that particular model.

The location/id table 404 also includes a port column 412. The port column 412 indicates a network address for each network-connected printer, or a parallel port identifier for each parallel-connected printer.

The location/id table 404 identifies the printers 116-120 that are present on the local area network 102. Workstation computer 114 hosts printer 116, which in this example, is an InkJet 312 model. Printer 116 is locally connected to workstation computer 114 through the USB port 230 of workstation computer 114, which is designated as LPT1 in the port column 412.

Workstation computer 112 hosts printer 118, which in this example, is a LaserJet 5P model. Printer 118 is network-connected, so a port address of 15.39.1.1 is shown in the port column 412. Workstation computer 110 hosts printer 120, which is a DeskJet 920 model. Printer 120 is connected via parallel port 211 of workstation computer 110 that has a network address of 15.39.3.5, as shown in the port column 412.

Printer 120 is a network printer, so it also shows up in another entry in the location/id table 404 with the same information in the printer name column 408,

the model column 410 and the port column 412. However, the host column 406 indicates that printer 120 is also hosted by the network 102.

The display 402 shown in Fig. 4 also includes a locate printers button 414 and a share window button 416. When the user interface initially appears, the location/id table 404 is blank. At step 308, a user activates the locate printer button 414 on the display 402. The printer information management system component 206 of workstation computer 108 (the computer on which the user is working) pings the local area network 102 and identifies all other printer information management system components on the network as well as directly pinging any network printers it can find on the network. It is noted that any workstation computer 108-114 that has a directly connected printing device will have a printing information management component stored in its memory.

The network-connected printers and the directly-connected printers respond to the inquiry from workstation computer 108 with a printer name, printer model, and a port number to which the responding printer is connected (step 310). The information regarding location and identification of each printer is then displayed to the user.

If the user wants a third-party to access the same information shown on the display 402, then the user activates the share window button 416 at step 314. Activation of the share window button 416 allows one or more third parties to view otherwise private information regarding the network printing devices. The user can then relinquish control of the diagnostics to the third party, or the user may concurrently access the diagnostics with the third party. Any party accessing the diagnostics program can then view status information, change printer settings,

run diagnostics, etc. using the printer information management system 248 (step 316).

Once the third-party diagnostician has control of the application, he or she can access the printer via normal network protocols such as TCP/IP, parallel port protocols such as Multiple Logical Channels (MLC) or IEEE 1284.4, or any other
5 network or direct connection protocol.

In one implementation, fees for the service can be charged by the third-party to the user. The third-party may charge fees based on a fixed-cost contractual agreement with the user, or the third-party may charge a fee to the user
10 each time the user accessed the printer information management system 348 on the remote diagnostics center website 246.

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Conclusion

The described implementations advantageously provide for remote management of local area network printers. The local area network printers can be connected to the network or they can be directly connected to a workstation computer, via a USB port, a parallel port, or a similar direct connection port. When the printers have been located, a local user can share the printer information with a third-party service provider located outside the local area network. The user may relinquish control of the diagnostic software to the third party, or the user may share simultaneous access to the diagnostic software with the third party. The described implementations also provide for a more convenient fee system that can be controlled by the third party service provider.

Although the invention has been described in language specific to structural features and/or methodological steps, it is to be understood that the invention defined in the appended claims is not necessarily limited to the specific features or steps described. Rather, the specific features and steps are disclosed as preferred forms of implementing the claimed invention.

CLAIMS

1 **1.** A system, comprising:
2 a workstation having one or more computers;
3 one or more printing devices connected to at least one computer in the
4 workstation; and
5 a remote diagnostic center configured to communicate with the one or more
6 printing devices and execute a printing device management application to obtain
7 diagnostic data from the one or more printing devices;
8 wherein the remote diagnostic center is located outside the workstation.

1 **2.** The system as recited in claim 1, wherein at least one of the one or
2 more printing devices is directly connected to a a workstation computer.

1 **3.** The system as recited in claim 1, wherein at least one of the one or
2 more printing devices is connected to the workstation through a local network.

1 **4.** The system as recited in claim 1, wherein:
2 the system comprises at least two printing devices;
3 a first printing device is directly connected to a workstation computer; and
4 a second printing device is connected to the workstation through a local
5 network.

1 **5.** The system as recited in claim 1, wherein the remote diagnostic
2 center further comprises a printer information management system that
3 communicates with the workstation through the Internet.

1 **6.** The system as recited in claim 5, wherein the printer information
2 management system is stored on an Internet website.

1 **7.** The system as recited in claim 5, wherein the printer information
2 management system is accessible by two or more concurrent users.

1 **8.** The system as recited in claim 1, wherein the remote diagnostic
2 center is further configured to obtain the diagnostic data only after receiving
3 authorization from a workstation computer.

1 **9.** A method, comprising:
2 communicating with a workstation having one or more computers and at
3 least one printing device connected to a workstation computer;
4 receiving diagnostic data from each printing device of the workstation;
5 wherein at least one printing device is directly connected to a workstation
6 computer.

1 **10.** The method as recited in claim 9, wherein the workstation includes
2 at least two printing devices, and at least one printing device is connected to the
3 workstation through a local network.

1 **11.** The method as recited in claim 9, further comprising simultaneously
2 viewing diagnostic data from the one or more printing devices on a workstation
3 computer and on a remote computer.

1 **12.** The method as recited in claim 9, wherein the communicating
2 further comprises communicating with the workstation through the Internet.

1 **13.** The method as recited in claim 12, wherein diagnostic software is
2 stored on an Internet website and is concurrently accessible by more than one user.

1 **14.** The method as recited in claim 9, further comprising receiving
2 permission from a workstation computer before receiving diagnostic data from a
3 printing device.

1 **15.** The method as recited in claim 9, wherein the printing devices
2 further comprise printers.

1 **16.** A method, comprising:
2 initiating a printer information management system from a computer of a
3 workstation having one or more computers and one or more printers connected to
4 the workstation computers, the printer information management system obtaining
5 diagnostic data from the one or more printers; and
6 granting permission to a remote user to control the printer information
7 management system to access the diagnostic data from the one or more printers;
8 and

9 wherein at least one printer is directly connected to a workstation computer.

1 **17.** The method as recited in claim 16, wherein the granting permission
2 to a remote user further comprises granted permission to a remote user to access
3 the diagnostic data through an Internet connection.

1 **18.** The method as recited in claim 17, wherein at least a portion of the
2 printer information management system is stored on an Internet website and is
3 concurrently accessible by two or more users.

1 **19.** The method as recited in claim 16, further comprising retaining
2 concurrent access to the diagnostic data after the remote user gains access to the
3 diagnostic data.

1 **20.** The method as recited in claim 17, wherein the printer information
2 management system is network-based, and the initiating further comprises
3 launching the printer information management system through a network
4 connection.

ABSTRACT

Systems and methods are described herein for remote management of local area network printing devices. The local area network printing devices can be located whether they are connected to the network or whether they are directly
5 connected to a workstation computer. When the printing devices have been located, a local user can share printing device information with a third-party service provider located outside the local area network. The user may relinquish control of the diagnostic software to the third party, or the user may share simultaneous access to the diagnostic software with the third party. Storage is
10 economized because the bulk of the management system software resides on an Internet server, and not on a workstation computer. The described implementation also provide for a more convenient fee system that can be controlled by the third party service provider for use of the printer information management system.

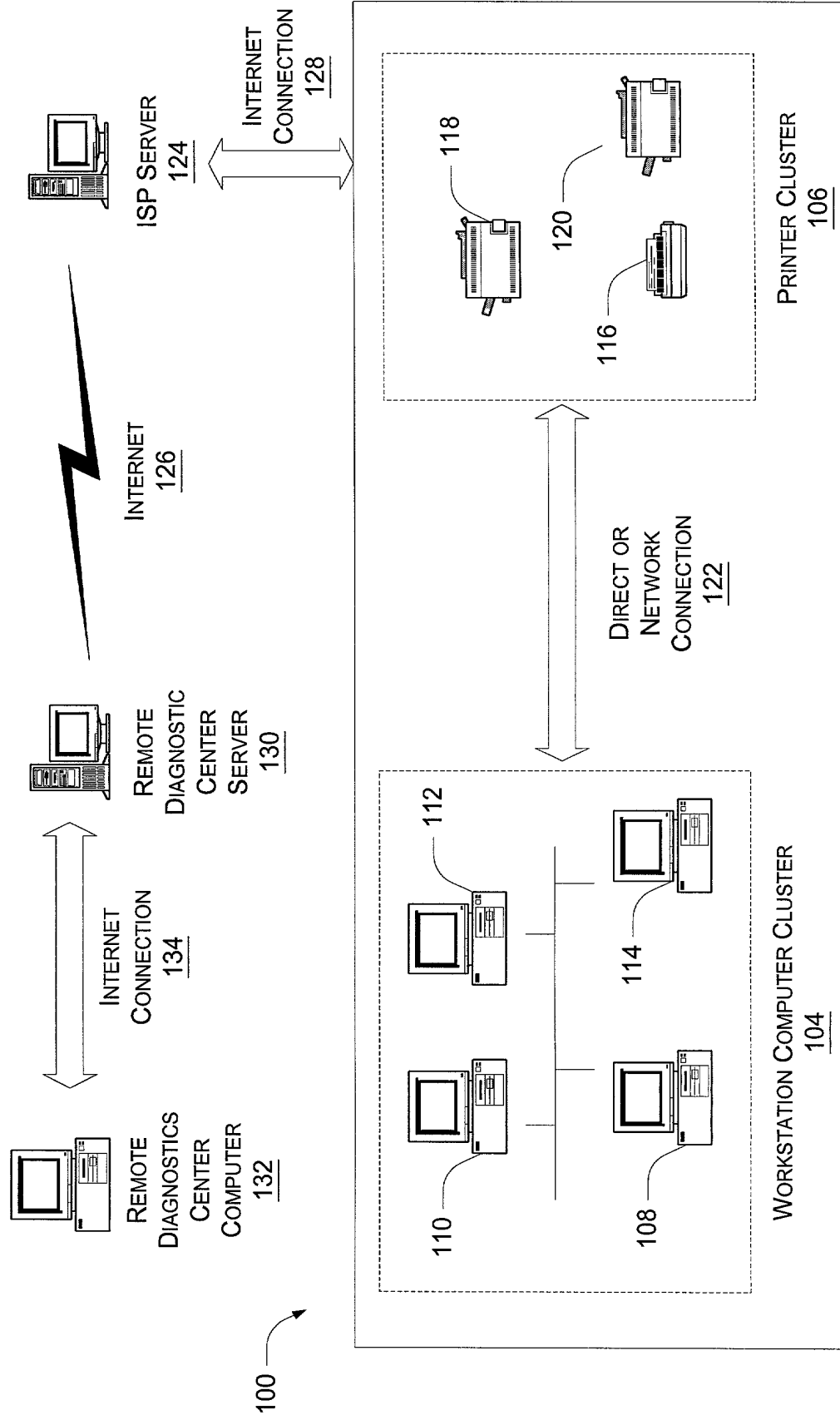


Fig. 1

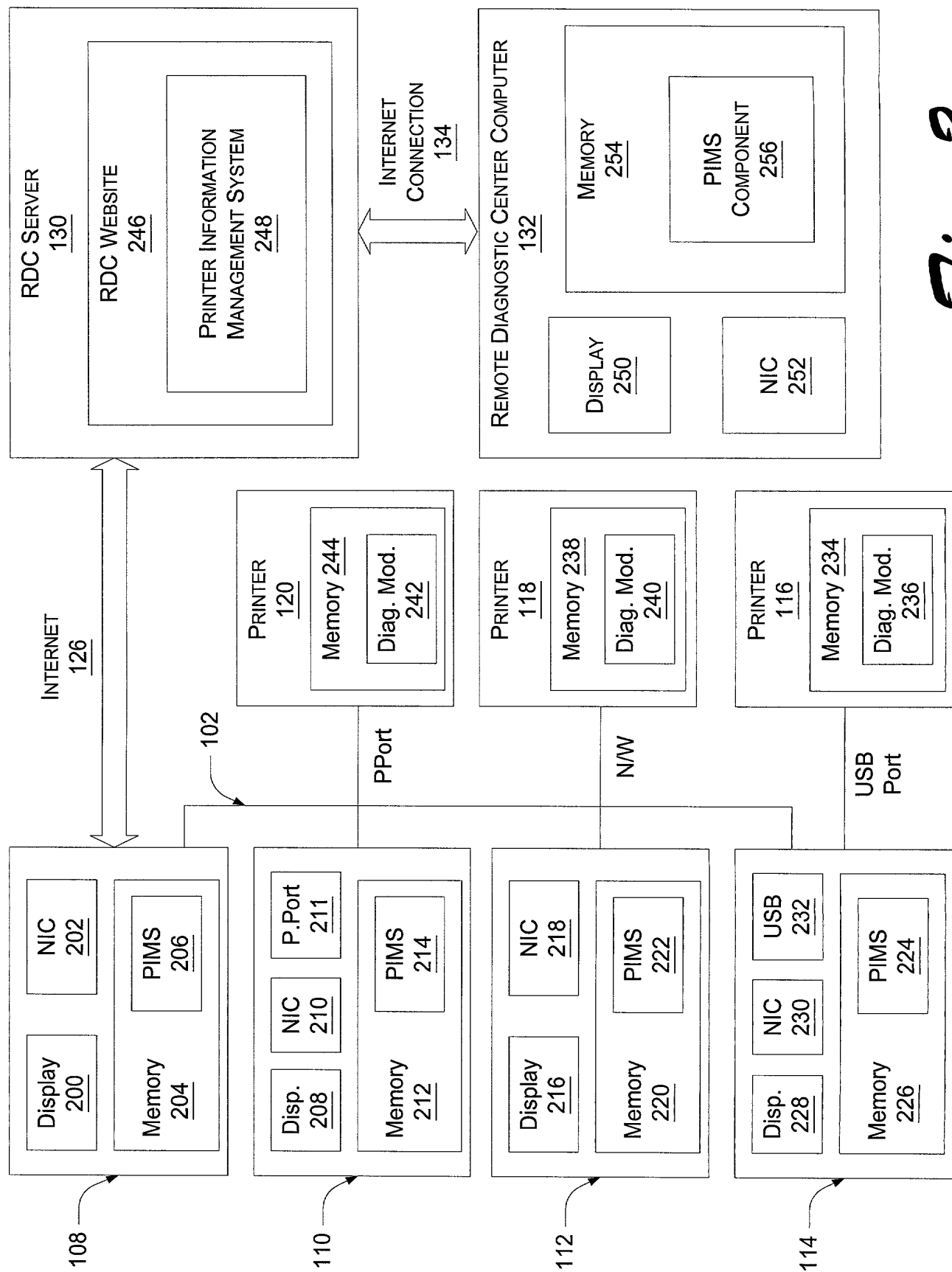


Fig. 2

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graph TD
    300([300 IDENTIFY PROBLEM WITH WORKSTATION PRINTER]) --> 302([302 ACCESS APPLICATION WITH WORKSTATION COMPUTER])
    302 --> 304{304 DIAGNOSTIC SOFTWARE ON WORKSTATION COMPUTER?}
    304 -- YES --> 308([308 LOCATE/ID PRINTERS])
    304 -- NO --> 306([306 DOWNLOAD DIAG. SOFTWARE])
    306 --> 308
    308 --> 310([310 RECEIVE PRINTER DATA ON WORKSTATION COMPUTER & DISPLAY])
    310 --> 312([312 GRANT ACCESS TO THIRD PARTY])
    312 --> 314([314 SEND DATA TO THIRD PARTY])
    314 --> 316([316 VIEW STATUS INFORMATION  
CHANGE PRINTER SETTINGS  
RUN DIAGNOSTICS])
  
```

Fig. 3

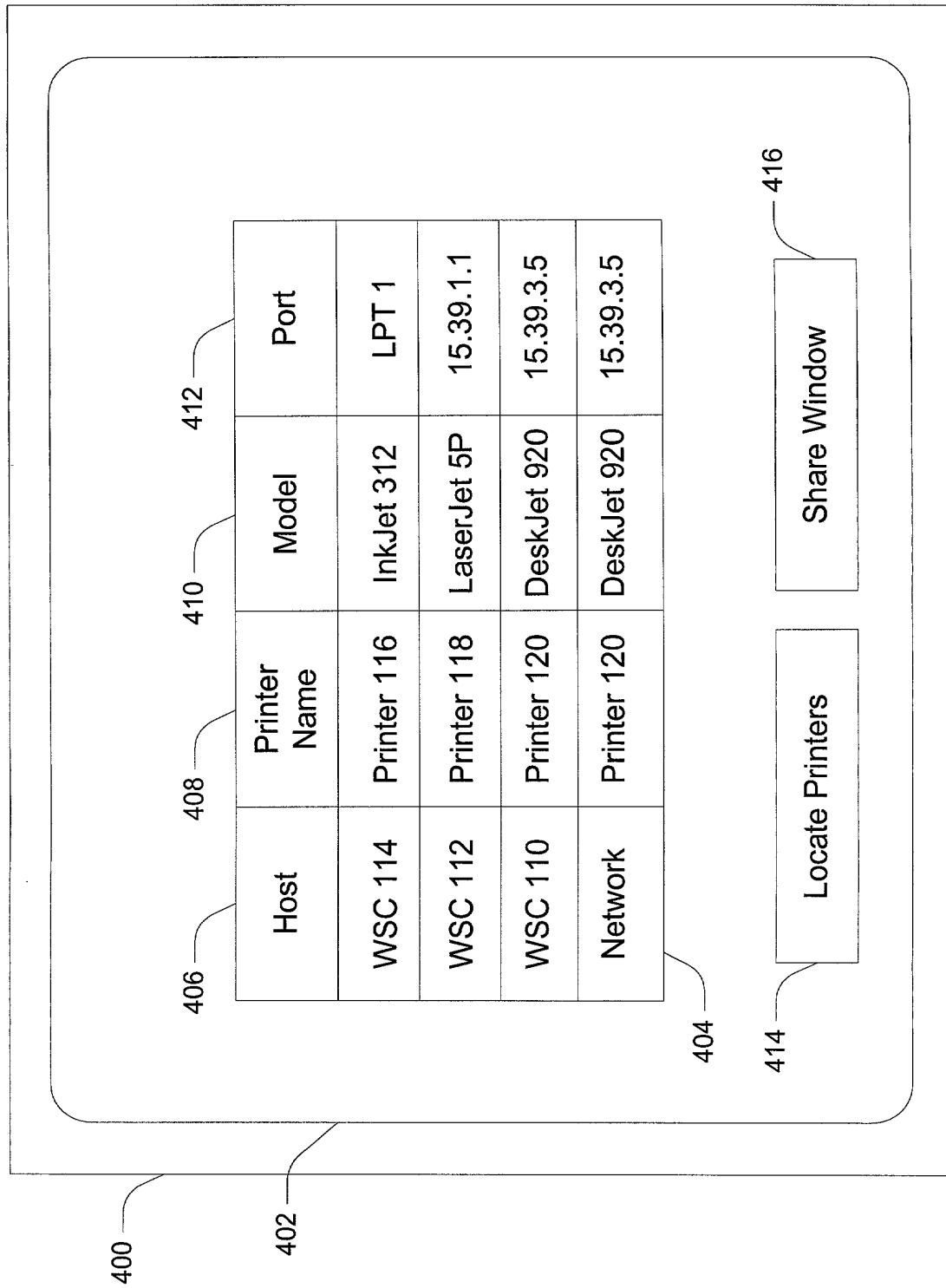


Fig. 4

**DECLARATION AND POWER OF ATTORNEY
FOR PATENT APPLICATION**ATTORNEY DOCKET NO. 10001609-1

As a below named inventor, I hereby declare that:

My residence/post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Systems And Method For Remote Management Of Printing Devices

the specification of which is attached hereto unless the following box is checked:

() was filed on _____ as US Application Serial No. or PCT International Application Number _____ and was amended on _____ (if applicable).

I hereby state that I have reviewed and understood the contents of the above-identified specification, including the claims, as amended by any amendment(s) referred to above. I acknowledge the duty to disclose all information which is material to patentability as defined in 37 CFR 1.56.

Foreign Application(s) and/or Claim of Foreign Priority

I hereby claim foreign priority benefits under Title 35, United States Code Section 119 of any foreign application(s) for patent or inventor(s) certificate listed below and have also identified below any foreign application for patent or inventor(s) certificate having a filing date before that of the application on which priority is claimed:

COUNTRY	APPLICATION NUMBER	DATE FILED	PRIORITY CLAIMED UNDER 35 U.S.C. 119
			YES: _____ NO: _____
			YES: _____ NO: _____

Provisional Application

I hereby claim the benefit under Title 35, United States Code Section 119(e) of any United States provisional application(s) listed below:

APPLICATION SERIAL NUMBER	FILING DATE

U. S. Priority Claim

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

APPLICATION SERIAL NUMBER	FILING DATE	STATUS (patented/pending/abandoned)

POWER OF ATTORNEY:

As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

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Number Bar Code
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Send Correspondence to:
HEWLETT-PACKARD COMPANY
Intellectual Property Administration
P.O. Box 272400
Fort Collins, Colorado 80527-2400

Direct Telephone Calls To:

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(208) 396-3047

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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DECLARATION AND POWER OF ATTORNEY
FOR PATENT APPLICATION (continued)

ATTORNEY DOCKET NO. 10001609-1

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Inventor's Signature *Will A Cox*

Date 3 NOV 2000

Full Name of # 4 joint inventor: _____ Citizenship: _____

Residence: _____

Post Office Address: _____

Inventor's Signature _____

Date _____

Full Name of # 5 joint inventor: _____ Citizenship: _____

Residence: _____

Post Office Address: _____

Inventor's Signature _____

Date _____

Full Name of # 6 joint inventor: _____ Citizenship: _____

Residence: _____

Post Office Address: _____

Inventor's Signature _____

Date _____

Full Name of # 7 joint inventor: _____ Citizenship: _____

Residence: _____

Post Office Address: _____

Inventor's Signature _____

Date _____

Full Name of # 8 joint inventor: _____ Citizenship: _____

Residence: _____

Post Office Address: _____

Inventor's Signature _____

Date _____